REFERENCE FRAMES, COORDINATE SYSTEMS AND MAP PROJECTIONS

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Introduction to Geodesy: Topographic maps, Elements of a map, Map scale, Relief representation, Geodesy definition, branches, and history. Coordinate systems in Geodesy: Horizontal and vertical datum: Important reference surfaces in Geodesy: Geoid, Ellipsoid and Topographical surface, Everest, WGS84 and GRS80 Ellipsoids, Geoid, Indian Mean Sea Level, Level Surfaces and plumb line, Deflection of Vertical and Geoid Undulations. Geometrical Relationships of an Ellipsoid: Geometrical relationship of an ellipse, Radius of curvature along the meridian and the prime vertical sections, Mean radius of curvature, Curves on an ellipsoid of revolution: Normal section azimuths and Geodesics, Direct/Inverse problems in Geodesy. Terrestrial Reference Systems: Terrestrial coordinate systems – Geocentric and Topocentric, Various geocentric coordinate systems and reference frames: Cartesian, Ellipsoidal, Natural and Geodetic Coordinate Systems and their inter-relationships, WGS84, IGS and ITRF Reference frames, Polar motion and Earth rotation. Map projections: Map projections: Introduction to Map Projections, Purpose and methods of map projections and their classification, Conformal projections – Special reference to Lambert Conformal Conic, Stereographic and Transverse Mercator, Equivalent and Equidistant projections, Indian Grid System, UTM Projection, Methods of map projection transformations